Amendments to the Drawings

The attached sheets of drawings includes a replacement sheet including changes to FIGS. 1 and 2 and a new drawing sheet adding FIG. 3 to the application. The replacement sheet replaces the original sheet including FIGS. 1 and 2. In FIGS. 1 and 2, previously omitted reference number 24 has been added. In FIG. 1, reference number 18 has been replaced with reference number 16 at the bottom of the figure.

Attachment: One replacement sheet and one new drawing sheet.

Remarks

By this Amendment, claims 1, 6-9, 14, 21, 22, 25-27, and 29 are amended. Claims 1-40 are pending in the present application. Reconsideration in view of the amendments and the following remarks is requested.

I. Objection to Drawings

FIG. 3, which shows carbon nanotubes 30 in layer 16, has been added to the application. Thus, the objection to the drawings should be withdrawn.

II. 35 U.S.C. 112 Rejection of Claims 6, 7, 9-14, and 26-34

Claims 6,7, 9-14 and 26-34 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite because there is insufficient antecedent basis for the term "materials" in claims 6, 7, 26, and 27. Applicant disagrees that these claims are indefinite. Base claims 1 and 21 recite the limitations "electrical current conductive materials" (which is plural) and "a plastic material" (which is singular). It is clear that the term "materials" in claims 6, 7, 26, and 27 refers to the "electrical current conductive materials," not the recited "plastic material." However, to expedite prosecution, claims 6, 7, 26, and 27 have been amended to include the phrase "electrical current conductive materials." Thus, this rejection should be withdrawn. The amendments do not narrow the scope of these claims.

III. Rejection of Claims 1-5, 15-25 and 35-40

Claims 1-5, 15-25 and 35-40 were rejected under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent No. 4,429,213 to Mathieu (Mathieu). Applicant traverses this rejection and requests that it be withdrawn.

Claims 1-5 and 15-20:

Claim 1, as amended, recites a flexible pipe configured to convey hydrocarbon fluids in subsea environments (added language underlined). The pipe comprises a tubular member formed of a plastic material, and a plurality of electrical current conductive materials dispersed in the plastic material for increasing the electrical conductivity of the tubular layer.

Applicant's device relates to a temperature controlled, flexible pipe of the type that can be used to transport crude oil, gas, or other similar hydrocarbon fluids in subsea environments.

As such, Applicant's device is related to a flexible pipe which must be resistant to collapse under substantial pressure yet which must be flexible and connectable to other equipment to enable a pipe line to connect a source to a supply point. It is well known that such flexible pipes have to perform for long periods of time under very adverse environmental conditions. Under such conditions only layers having a robust and stable nature can be utilized.

A problem with conventional flexible pipes used to transport hydrocarbon fluids is that under the high undersea pressures sometimes experienced, the fluids can freeze/solidify. This causes clogging of the pipe. This effect is particularly pronounced because such high pressure subsea environments tend to be cold (which facilitates freezing of the conveyed fluid).

Applicant's device is based upon a realization that a new type of layer can be provided in such a flexible pipe in which electrically conductive material can be dispersed in a plastic material and current passed through the layer to produce a heating effect to ensure that fluid flow does not clog. The dispersion of electrical current conducting material in a plastic material layer has an advantage over the use of a solid metal layer because it is lighter.

By contrast, Mathieu relates to a very different type of pipe used in different environmental conditions than Applicant's pipe. Specifically, Mathieu is understood to disclose a water pipe provided with a heater to maintain running water through the pipe in unheated or open areas. Col. 1, lines 18-21; col. 6, lines 43-44. The heater has an electrical cable assembly 22, which has a simple male plug for connection to a source of electrical power, such as 120 volt, 60 cycle alternating current power commonly available for household use. Col. 3, lines 31-42. Mathieu's pipe therefore is designed for household use where a homeowner desires to provide a pipe capable of carrying water but wishes to ensure that the water will not freeze during the winter and burst the pipe. Household pipes tend to be rigid and would be crushed flat at the pressures at which flexible pipes for subsea environments operate.

In short, Mathieu does not teach or suggest a pipe configured to convey fluids in subsea environments, as recited in claim 1. Furthermore, one skilled in the art trying to identify ways to solve the clogging problem of conventional flexible pipes used in subsea environments would not look to the technology disclosed in Mathieu, as he would understand that such technology would not be applicable to subsea flexible pipes. Accordingly, claim 1 is not anticipated or rendered obvious by Mathieu and is allowable.

Claims 2-5 and 15-20 depend from claim 1 and therefore are allowable for the reasons given above in support of claim 1 and because each dependent claim sets forth an independently patentable combination of features.

Claims 21-24 and 35-40:

Claim 21, as amended, recites a method of manufacturing a flexible pipe configured to convey hydrocarbon fluids in subsea environments. The method comprising forming the pipe, at least in part, with a tubular member formed of a plastic material, a plurality of electrical current conductive materials being dispersed in the plastic material for increasing the electrical conductivity of the tubular layer (added language underlined).

In contrast to claim 21, Mathieu is understood to disclose a rigid, heated water pipe used in household applications. Mathieu fails to teach or suggest a flexible pipe capable of withstanding subsea conditions. Accordingly, claim 21 is not anticipated or rendered obvious by Mathieu and is allowable.

Claims 22-24 and 35-40 depend from claim 21 and therefore are allowable for the reasons given above in support of claim 21 and because each dependent claim sets forth an independently patentable combination of features.

IV. Rejection of Claim 8

Claim 8 was rejected under 35 U.S.C. 103(a) as allegedly being obvious from Mathieu in view of U.S. Patent No. 6,426,134 to Lavin et al. (Lavin). Applicant traverses this rejection and requests that it be withdrawn.

Claim 8 depends from claim 1 and is allowable for the reasons given above in support of claim 1. Claim 8, in combination with claim 7, further specifies that the electrical current conductive materials are nanotubes comprising a convex cage of atoms with only hexagonal and/or pentagonal faces.

The action concedes that Mathieu does not disclose carbon nanotubes dispersed in a plastic tubular member. Lavin does not make up for the deficiencies of Mathieu. The action contends that it would have been obvious "to modify the device of Mathieu to use the nanotube technology in particular the fullerenes, defect free nanotubes expected to have remarkable mechanical and electronic properties, in order to better the performance of the Mathieu device by

improving the polymer materials used." Applicant respectfully submits that this contention is speculative and not supported by any teachings of Lavin.

While Lavin states that "defect-free nanotubes are expected to have remarkable mechanical, electronic, and magnetic properties," there is no hint or suggestion in Lavin that nanotubes, when dispersed in a polymeric material, enables the polymeric material to be used as an electric heating element when current is passed therethrough. Furthermore, Lavin is completely silent in regards to the performance of the carbon nanotubes relative to the materials used in Mathieu. Thus, there is no teaching or suggestion that using nanotubes in the Mathieu device would improve the performance of the device.

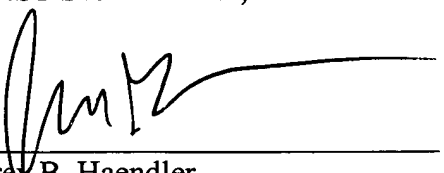
The action also mentions the patent to Zhou in the rejection of claim 8 (although it is unclear whether the rejection of claim 8 is based on Zhou). Zhou likewise does not teach or suggest dispersing nanotubes in a polymeric material for use as an electric heating element or provide any indication that the performance of the nanotubes would be better than the materials used in Mathieu.

V. Conclusion

The present application is in condition for allowance and such action is respectfully requested. If any further issues remain concerning this application, the Examiner is invited to call the undersigned to discuss such matters.

Respectfully submitted,

KLARQUIST SPARKMAN, LLP



By _____
Jeffrey B. Haendler
Registration No. 43,652

One World Trade Center, Suite 1600
121 S.W. Salmon Street
Portland, Oregon 97204
Telephone: (503) 226-7391
Facsimile: (503) 228-9446

Jeffrey B. Haendler
Our Ref. No. 7156-70276-01
Application No. 10/620,826 Filed: July 16, 2003
Art Unit: 3742 Examiner: Thor S. Campbell
For: TEMPERATURE CONTROLLED PIPE AND METHOD OF MANUFACTURING SAME
Inventor(s): John R. Belcher

ANNOTATED SHEET SHOWING CHANGES

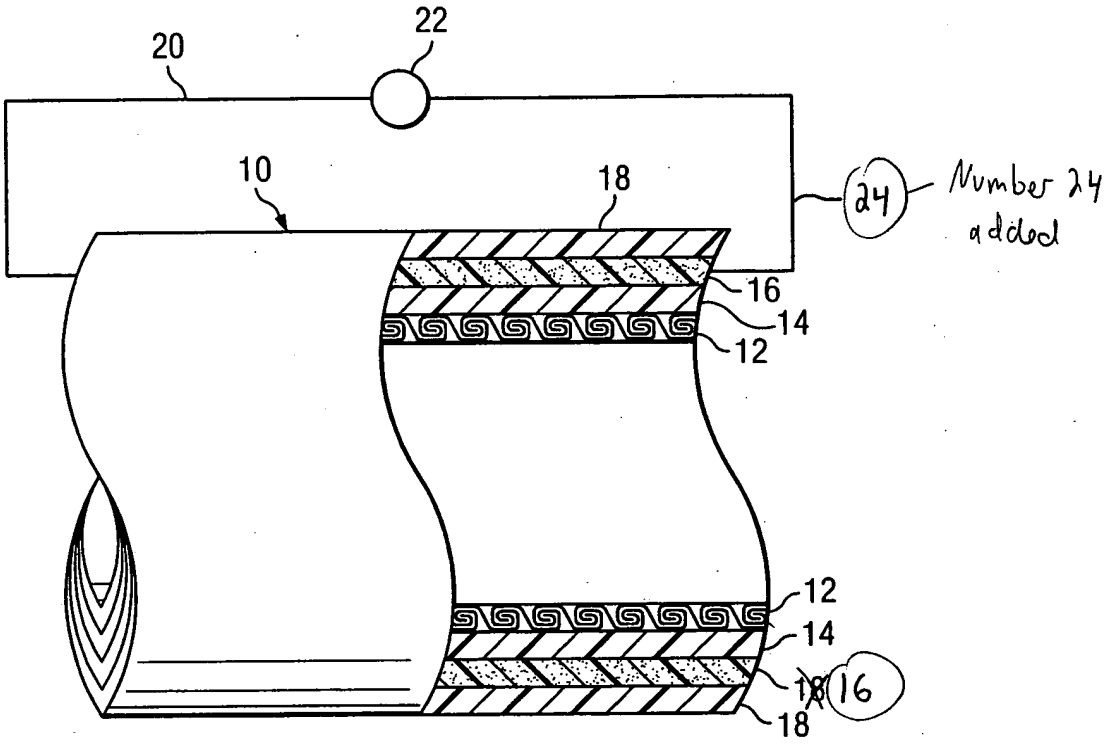


Fig. 1

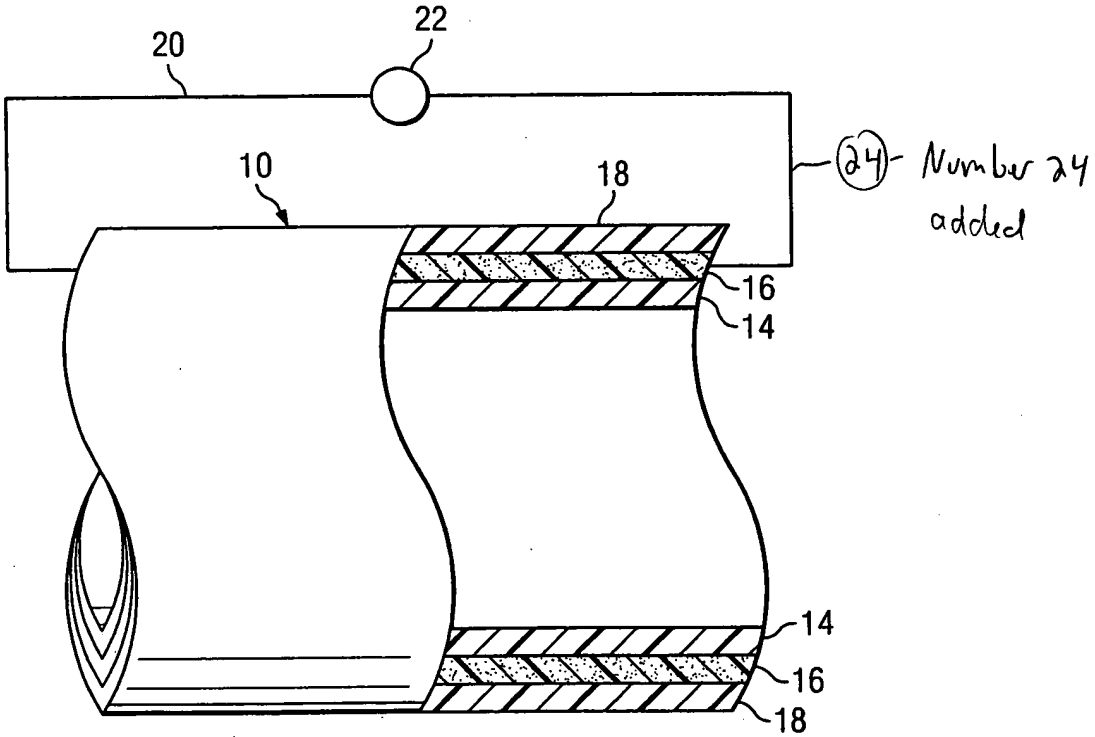


Fig. 2